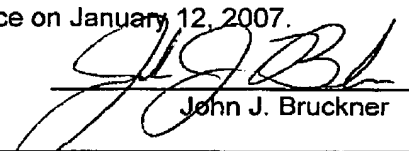


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
<b>FILING OF SIGNED DECLARATION UNDER 37 CFR 1.132</b>	Atty. Docket No. <b>UBAT1110</b>
Applicant(s) <b>Stephen F. Smith et al.</b>	
Application Number <b>10/750,432</b>	Date Filed <b>December 31, 2003</b>
For <b>Hybrid spread spectrum radio system</b>	
Group Art Unit <b>2631</b>	Examiner <b>Burd, Kevin Michael</b>
Confirmation Number: <b>1772</b>	
<b>Certificate of Facsimile Under 37 C.F.R. 1.8</b>	
I hereby certify that this correspondence is being facsimile transmitted to facsimile number 571-273-8300 at the United States Patent and Trademark Office on January 12, 2007.	
 John J. Bruckner	

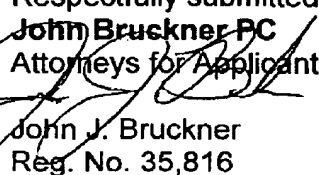
Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Applicant herewith submits an original signed Declaration under 37 CFR 1.132 for consideration by the Examiner in the above-identified application. The Declaration can speak for itself.

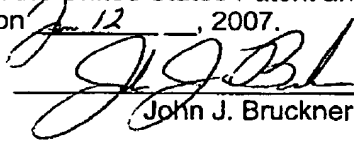
While Applicants believe no (further) fees are due, if any (further) fees are due, the Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3204 of John Bruckner PC.

Dated: Jan 12, '07  
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Respectfully submitted,  
**John Bruckner PC**  
Attorneys for Applicant  
  
John J. Bruckner  
Reg. No. 35,816

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DECLARATION UNDER 37 CFR 1.132	Atty. Docket No. UBAT1110
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Commissioner of Patents  
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Alexandria, VA 22313-1450

Dear Sir:

I, Stephen F. Smith, declare as follows:

1. I am the first named inventor of the above-identified pending U.S. utility patent application.

2. **Kostreski, et al.** (U. S. Patent No. 6,005,605), contrary to the Examiner's assertion (Office Action of 06/28/2006, ¶4) does **not** teach "generating a spread spectrum signal using a pseudorandom code generator to control a fast frequency hopping synthesizer". Although Kostreski mentions the existence of fast frequency hopping *per se* (¶12, lines 58-67 and ¶13, lines 1-3), he at no point teaches the use of fast frequency hopping in combination with his system. In fact, the use of FFH would be detrimental to the Kostreski system, due to the much higher resulting cost and complexity of the customers' receiving hardware, as well as the reduced bandwidth efficiency. Further, Kostreski at no time discloses any hybrid spread-

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spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention.

3. Kostreski discloses a robust television distribution system and bandwidth-efficient multiple-access method which employs time-division multiplexed, packetized slow frequency hopping of nonspread, multilevel (e.g., 64-QAM) data modulation of digitized video information (§12, lines 4-18). Kostreski also discloses redundant-path transmissions to provide robust service to users blocked by terrain or obstacles from the primary distribution transmitter. Textbook definitions of direct-sequence (DS), frequency hopping (FH), time hopping (TH), time-frequency hopping (TH-FH), and chirp spread-spectrum modulations are recited (§12, lines 26-42). Further definitions of code-division multiple access (CDMA), slow frequency hopping (SFH) and fast frequency hopping (FFH) CDMA systems are also recited (§12, lines 58-67 and §13, lines 1-3). The system of choice for Kostreski is SFH-CDMA, as described in his §13, lines 4-27. For his application, he uses the described MPEG-II digital video encoding standard, with a packet length of 188 bytes (§9, lines 54-67 and §10, lines 1-23). Using the parameters of Kostreski, one-half second of video requires 3 Mbits, or 4000 MPEG-II transport packets. Clearly, this is *slow* frequency hopping (many bits per hop); the example hop time is roughly 2  $\mu$ s, which for the composite 27 Mb/s stream is also clearly indicative of *slow* hopping (again, many bits per hop).

4. In addition, Kostreski in no way discloses or even hints at combining DSSS with any form of hopping, since to do so would vastly exceed the available bandwidth for his video distribution system in the Multi-channel Multi-point Distribution Service [MMDS](§2, lines 9-23). Kostreski in fact is employing a *very* slow multiplexed hopping format to provide frequency diversity in his system, which with the spatial diversity of using different paths from the multiple transmitters to a given user's receiver, provides adequately robust service to all users, especially

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those at locations overlapped by different primary transmitters. In short, Kostreski **at no time** discloses any hybrid spread-spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention.

5. As noted above, Kostreski **at no time** discloses any hybrid spread-spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention. Clark does not obviate this deficiency of Kostreski.

6. **Clark, et al.** (U. S. Patent Publication No. 2002/0168937) contrary to the Examiner's argument (Office Action, ¶5) does **not** disclose "combining frequency hopping spread spectrum and direct sequence spread spectrum to facilitate communication with or among a plurality of nodes". Clark **at no time** discloses or teaches any specific hybrid spread-spectrum (HSS) transmission techniques [i.e., integrally combining DS and FH modulations] at all, much less the synergistic DS/FFH technique of the instant invention. Further, DS is specifically called out in Clark (his ¶0010 and ¶0029) as an **alternative** to frequency hopping, **not** in combination, as in the instant case.

7. In general, Clark discloses a wireless communications system tailored for industrial welding-cell production environments. Slow frequency-hopping (SFH) spread-spectrum communications links (e.g., commercial Bluetooth, ConnexRF, etc.) are utilized to improve remote monitoring and control, engineering optimization of the welding process parameters, and better service and maintenance of the usually hard-to-access welding station hardware. SFH is used to improve the RF communications reliability in the electromagnetically noisy (e.g., broadband RF interference due to the welding arcs plus other in-band RF signals) industrial environment. Clark does not at any point disclose fast frequency hopping (FFH), but only slow hopping (e.g., Bluetooth) to improve the noise immunity and offer low cost (¶0010). His mention

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of DSSS is simply reciting a possible "frequency adjusting" *alternative* to FHSS as the link modulation protocol (§§0010 and §§0029). Multipath effects (and any specific techniques to address same) are never mentioned in Clark, nor at any time does he mention FFH or (obviously, then) suggest combining any form of *fast* hopping with DSSS. In summary, Clark at no time discloses any specific hybrid spread-spectrum (HSS) transmission techniques [i.e., integrally combining DS and FH modulations] at all, much less the synergistic DS/FFH technique of the instant invention.

8. With regard to claim 4, as noted above, Kostreski and/or Clark do not disclose any hybrid spread-spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention. Swanke does not obviate this deficiency of Kostreski/Clark.

9. **Swanke** (U. S. Patent No. 5,521,533) fails to disclose the detailed direct digital synthesizer (DDS) device implementations of the hybrid (DS/FFH, FFH/TH, or DS/FFH/TH) spread-spectrum systems as depicted in Figs. 7 and 8 of the instant case. Swanke only shows the use of a DDS in a basic frequency-hopping context, or two such devices in order to reduce the normal levels of spurious RF output signals to negligible amounts. He at no time shows any circuit implementations to achieve DSSS, TH, or amplitude control as are depicted in the instant case (in Figs. 7 and 8; text at §§0047 and §§0060-0066). Swanke further never mentions any modulation form except basic FH, much less the specific hybrid spread-spectrum formats of the instant invention (DS/FFH and the others).

10. With regard to claims 9-10, Kostreski and/or Clark do not disclose any hybrid spread-spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention. Barrett does not obviate this deficiency of Kostreski/Clark. Further, Barrett does not disclose or suggest the limitations of

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claim 9.

11. **Barrett** (U. S. Patent No. 5,592,177) actually teaches away from standard linear-polarized ("elliptical") pairs of orthogonally oriented antennas to obtain his desired helical wavefront, instead employing an intervening phase shifter (delay element) between the RF source and at least one of the two antennas. The instant invention, by contrast, uses two orthogonal antennas (see our Figure 11) which use **no** phase shifter but only a standard in-phase ("0°") signal splitter [element 1133 in the dual-polarization HSS transmitter of Fig. 11]. The corresponding receiver of the instant invention (in Fig. 12, elements 1241 [V] and 1243 [H], feeding the in-phase Combiner) uses a corresponding time-synchronous (in-phase) structure to optimally combine the two independent, linearly polarized H and V channels.

12. Barrett discloses methods of controlling the polarization of a transmitted radio wave using two orthogonally polarized antennas on a common axis, with an intervening phase shifter or delay element between the RF source and at least one of the two antennas. Barrett's scheme clearly generates a helical wavefront from the composite antenna (either right-handed or left-handed orientations), commonly termed "circular" polarization (either RHCP or LHCP). The relative phase shifts between the two orthogonal waves launched from the orthogonal antennas are controlled by the phase-shifter elements (labeled " $-\beta$ " in his Figures 7 and 8) and produce the helically (circularly) polarized waves. Again, Barrett teaches away from standard linear-polarized ("elliptical") pairs of orthogonally oriented antennas to obtain his desired helical wavefront. In contrast, the instant invention **requires** the use of two time-synchronous (co-phased) orthogonally polarized waves (typically H and V) to achieve the stated benefits of avoiding cancellation of the signal in highly reflective (multipath) environments (see instant ¶0042, ¶0072, and ¶0073). In general, due to the differing reflection coefficients in a high-multipath scenario for the independent H and V waves, at any given point in space, if the H wave

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has a null, statistically the V wave will not. To exploit this fact, the instant invention requires that the H and V waves be in exact time sync when launched. Barrett, in contrast, teaches away from this condition, instead trying to dynamically change the time (phase) relationship between the two orthogonal waves; this will work properly only in benign, line-of-sight RF paths. The methods of Barrett will in general fail in non-minimum-phase or highly nonlinear-phase paths (e.g., in heavy multipath situations) since the multipath will often scramble the phase of the polarization-versus-carrier phase relationships in the signal of Barrett and the receiver will be unable to correctly resolve the incoming signal phase components. Thus, Barrett's technique will usually fail in high-multipath and high-noise environments, as opposed to the instant invention, which is expressly designed to provide good signal integrity (i.e., low bit error rates) in such environments. An additional disadvantage of Barrett is the relative frequency sensitivity of his inter-antenna phase shifter, which is a problem in implementing fast frequency-switching systems.

13. With regard to claim 11, as noted, Kostreski and/or Clark do not disclose any hybrid spread-spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention. Becker does not obviate this deficiency of Kostreski/Clark.

14. **Becker**, et al., U.S. Patent 6,726,099 (hereinafter, Becker) discloses a bidirectional spread-spectrum RFID system using simple frequency hopping on the tag-to-reader RF link and standard direct-sequence spreading on the reader-to-tag transmissions (paragraph 4, lines 45-58; paragraph 6, lines 62-67 through paragraph 7, lines 1-7). The DS and FH modulations of Becker are never used on the same link, and no specific relationship between these component modulations is ever established. Becker never discloses true time-hopping modulation in conjunction with fast frequency hopping, but instead pre-selects frequency

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channels and time slots for transmissions to minimize mutual interference among tags in his system, although he does disclose an optional pseudorandom selection of his tag transmission time slots. Thus, Becker never discloses the concatenated hybrid spread-spectrum methods of the instant invention, only existing-art spread-spectrum transmission techniques.

15. With regard to claims 33-34, 36, 68 and 70-72, Kostreski and/or Clark do not disclose any hybrid spread-spectrum (HSS) transmission techniques at all, much less the specific DS/FH technique of the instant invention. Again, Barrett does not obviate this deficiency of Kostreski/Clark. Furthermore, Barrett does not disclose or suggest the limitations of claim 33.

16. As noted above, Barrett (U. S. Patent No. 5,592,177) actually teaches away from standard linear-polarized ("elliptical") pairs of orthogonally oriented antennas to obtain his desired helical wavefront, instead employing an intervening phase shifter (delay element) between the RF source and at least one of the two antennas. The instant invention, in contrast, uses two orthogonal antennas (see our Figure 11) which use *no* phase shifter but only a standard in-phase ("0°") signal splitter [element 1133 in the dual-polarization HSS transmitter of Fig. 11]. The corresponding receiver of the claimed invention (in Fig. 12, elements 1241 [V] and 1243 [H], feeding the in-phase Combiner) uses a corresponding time-synchronous (in-phase) structure to optimally combine the two independent, linearly polarized H and V channels.

17. With regard to claim 35, Kostreski, Clark and/or Barrett do not disclose any hybrid spread-spectrum (HSS) transmission techniques at all, much less the specific DS/FH/polarization technique of the instant invention. Swanke does not obviate this deficiency of Kostreski/Clark/Barrett.

18. With regard to claims 45 and 58, as noted above, Kostreski and/or Clark do not disclose any hybrid spread-spectrum (HSS) transmission techniques at all, much less the specific techniques of the instant invention. Again, Becker does not obviate this deficiency of



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Kostreski/Clark.

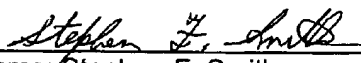
19. With regard to claim 52, as repeatedly noted above, Kostreski does not disclose any hybrid spread-spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention. Swanke does not obviate this deficiency of Kostreski.

20. With regard to claims 56-57, as previously noted, Kostreski does not disclose any hybrid spread-spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention. Barrett does not obviate this deficiency of Kostreski. Further, Barrett does not disclose or suggest the limitations of claim 56.

21. With regard to claim 69, as previously noted, Kostreski, Clark and/or Barrett do not disclose any hybrid spread-spectrum (HSS) transmission techniques [i.e., combining DS and FH modulations] at all, much less the specific DS/FFH technique of the instant invention. Becker does not obviate this deficiency of Kostreski/Clark/Barrett.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Jan. 11, 2007  
Dated:

  
Name: Stephen F. Smith  
Title: Senior Development Staff Member  
Oak Ridge National Laboratory